

Claims

1 1. In a metal treating apparatus having a container for holding a bath
2 of molten metal, a gas-filled housing for enclosing a moving strip of metal, the
3 housing having an opening in said bath of molten metal below the level thereof,
4 through which the strip of metal exits the housing while submerged in the molten
5 metal, and an apparatus for removing a layer of dross from the surface of the
6 metal bath inside the gas-filled housing, comprising:

7 a conduit having an inlet opening adjacent the surface of the
8 molten metal for receiving dross into the conduit;

9 the conduit having an outlet opening for discharging dross
10 received through said inlet opening;

11 the conduit having a gas-receiving opening below the outlet
12 opening, such that a gas rises in said conduit to induce a flow of dross into said
13 inlet opening and towards said outlet opening; and

14 the gas-receiving opening being disposed to discharge the
15 gas into the conduit in the same direction as the dross flows in the conduit.

1 2. The apparatus of claim 1, in which the gas-receiving opening is
2 disposed adjacent the lowest portion of the conduit, and vertically beneath the
3 outlet opening.

1 3. The apparatus of claim 1, further comprising a second conduit for
2 introducing the gas, attached to the first conduit, the first conduit comprising a

generally U-shaped member having a pair of vertical legs with openings in their
respective upper ends for respectively receiving and discharging the dross.

Sub 17
4. ~~The apparatus of claim 1, wherein said conduit is comprised of a
material selected from stainless steel, temperature resistant alloy, graphite,
ceramic or mixtures thereof.~~

5. The apparatus of claim 1, including an apparatus for introducing the
gas intermittently into the conduit to form a series of spaced rising bubbles which
entrap and move sections of molten metal and dross.

6. The apparatus of claim 1, including a vertically oriented gas
delivery leg secured to a base member, said gas delivery leg having a gas
passage in fluid communication with a gas duct in said base member, said
conduit being secured to said base member wherein said gas-receiving opening
is in fluid communication with said gas duct.

7. The apparatus of claim 1, further including a convergent/divergent
nozzle in the conduit.

8. The apparatus of claim 7, in which the convergent/divergent nozzle
is disposed between the gas receiving opening and the outlet opening.

1 9. The apparatus of claim 6, wherein said gas delivery leg is
2 comprises of a graphite body housed in a ceramic sleeve.

1 10. A metal treating process in which a moving strip of metal passes
2 through a bath of molten metal in a gas-filled housing which encloses the moving
3 strip of metal, the housing having an opening in said bath of molten metal below
4 the level thereof, through which the strip of metal exits the housing while
5 submerged in the molten metal, a method for moving a material selected from
6 molten metal, dross or mixtures thereof inside the gas-filled housing, comprising:

7 positioning a conduit having an inlet opening adjacent either
8 the surface of the molten metal for receiving dross into the conduit, or below the
9 surface for receiving molten metal and an outlet opening for discharging the
10 received dross or molten metal; and

11 introducing a gas into the conduit in the same direction as
12 the motion of the metal or dross, whereby the gas rises in the conduit to induce a
13 flow of dross into the inlet opening and towards the outlet opening.

Sub A2
11. An apparatus for removing a layer of dross from the surface of a
2 metal bath comprising a generally U-shaped conduit including a first leg having an
3 inlet opening, and a second leg having an outlet opening for discharging dross
4 receiving through said inlet opening, the second leg having a longitudinal axis
5 wherein a gas-receiving opening and the outlet opening lie generally on said
6 longitudinal axis.

0918603-102598

1 12. The apparatus of claim 11, including a pump body mated with the
2 conduit adjacent the gas-receiving opening, an elongated gas delivery member
3 having a gas passage for delivering gas and a lower end threadably connected to
4 a threaded section of the pump body and an upper end extending above the U-
5 shaped conduit and adapted for receiving a gas, and a sleeve encasing the gas
6 delivery member.

1 13. The apparatus of claim 12, in which the pump body is formed of
2 graphite.

1 14. The apparatus of claim 12, in which the gas delivery member is
2 formed of graphite, and the sleeve is formed of a ceramic.

1 15. The apparatus of claim 11, in which the conduit is formed of a
2 ceramic.

1 16. The apparatus of claim 11, including a tubular member forming a
2 gas delivery element.

1 17. In a metal treating apparatus having a container for holding a bath
2 of molten metal, a gas-filled housing for enclosing a moving trip of metal, the
3 housing having an opening in said bath of molten metal below the level thereof,

09178603-102698

4 through which the strip of metal enters the housing while submerged in the
5 molten metal, and an apparatus for diluting a layer of dross at the surface of the
6 metal bath inside the gas-filled housing, comprising:

7 a conduit having an inlet opening below the surface of the
8 molten metal;

9 the conduit having an outlet opening adjacent the layer of
10 dross;

11 the conduit having a gas-receiving opening below the outlet
12 opening such that gas rises in said conduit to induce a flow of metal into said
13 inlet opening and towards said outlet opening; and

14 the gas-receiving opening being disposed to discharge the
15 gas into the conduit in the same direction as metal flows in the conduit.

1 18. The apparatus of claim 16, further including a convergent/divergent
2 nozzle in the conduit.

SubA37 19. An apparatus for diluting a layer of dross at the surface of a metal
2 bath comprising a generally U-shaped conduit having a first leg having an inlet
3 opening, and a second leg having an outlet opening for discharging metal
4 received through said inlet opening, the conduit having a gas-receiving opening
5 below the outlet opening,

6 a pump body mated with the conduit adjacent the gas-
7 receiving opening;

Sub 37
cont.

8 an elongated gas delivery member having a lower end
9 threadably connected to a threaded section of the pump body and an upper end,
10 extending above the second leg and adapted for receiving a gas; and

11 a sleeve encasing the gas delivery member, the sleeve
12 having an upper end above the second leg, said pump body and said gas
13 delivery member including a gas passage for delivering gas into said conduit.

1 20. The apparatus of claim 19, in which the body is formed of graphite.

1 21. The apparatus of claim 20, in which the gas delivery member is
2 formed of graphite and the sleeve is formed of a ceramic.

1 22. An apparatus for moving a material selected from the group
2 consisting of dross molten metal and mixtures thereof in a metal bath comprising
3 a generally U-shaped conduit including a first leg having an inlet opening, and a
4 second leg having an outlet opening, the second leg having a longitudinal axis
5 wherein a gas receiving opening and the outlet opening lie generally on said
6 longitudinal axis.

1 23. The apparatus of claim 22, being comprised of a material selected
2 from the group consisting of ceramic, graphite, and mixtures thereof.

1 23/24. The apparatus of claim 22, including a pump body mated with the
2 conduit adjacent the gas receiving opening, an elongated gas delivery member
3 having a gas passage for delivering gas into said conduit and a lower end
4 threadably connected to a threaded section of the pump body and an upper end,
5 extending above the U-shaped conduit and adapted for receiving a gas, and a
6 sleeve encasing the gas delivery member.

Sub A 51
25. The apparatus of claim 11, including a tubular member forming a
2 gas delivery element.

09178603-102698